DOCUMENT RESUME

ED 098 755 EC 070 476

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TITLE The Child and the Learning Environment: A Review of Literature on Diagnosis and Prescription in Learning.
INSTITUTION State Univ. of New York, Buffalo. Coll. at Buffalo. Educational Research and Development Complex.
PUB DATE May 74
NOTE 29p.; For a related bibliography see EC 070 475

EDRS PRICE MF-$0.75 HC-$1.85 PLUS POSTAGE
DESCRIPTORS Cognitive Development; *Diagnostic Teaching; Diagnostic Tests; Educational Planning; *Exceptional Child Education; *Individual Characteristics; Individualized Instruction; Learning Characteristics; *Learning Disabilities; *Literature Reviews; Perceptual Development; Remedial Instruction

ABSTRACT

The literature review reports research and theory focusing on the following topics: individual intellectual and perceptual characteristics of a child's learning style; an overview of ability and disability areas relative to the learner's specific cognitive processes; the use of standardized tests to evaluate cognitive processes and the usefulness of several tests on predicting learning capabilities; and various ongoing studies which address themselves to diagnostic-prescriptive planning for individualized instruction. Individual characteristics are discussed in reference to literature or such topics as differences in the ways boys and girls learn, optimal ages for learning certain skills, theories of intellectual structure, and teacher variables influencing learning (such as ability to personalize instruction). Noted are publications in which learning abilities and disabilities are examined in terms of their effect upon the child's overall learning style and within the framework of the relationship between reading proficiency and such factors as right-left orientation, visual language function, auditory training, vocabulary and speech development, and collective intellectual elements. Reports of literature on testing reveal differences of opinion as to the diagnostic effectiveness of various evaluative instruments. Curriculum emphasis, the role of the classroom teacher, the structure of remedial educational environments (such as Atlanta's Project Success), and preschool educational intervention are subjects considered in the review of documents on planning. (LH)

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The Child and the Learning Environment

A REVIEW OF LITERATURE ON DIAGNOSIS AND PRESCRIPTION IN LEARNING

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May, 1974

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INTRODUCTION

In order to develop an appropriate testing inventory which would serve as a diagnostic tool capable of assisting the classroom teacher in an identification of the learner's abilities and disabilities, preliminary investigations had to be made into the literature dealing with the total concept of the learning child. The research that follows approaches this concept of the total learning child from four major directions; each direction representing a legitimately significant component of the total learning process, and when combined representing a maximum effort relating to the identification, assessment and amelioration of the child within the framework of his learning environment.

The research in Part I relates to the individual characteristics which combine to describe the intellectual and perceptual components of a child's learning style, Part II investigates the learner's ability and disability areas relative to his specific cognitive processes, and Part III reviews the evaluation of these processes through the use of standardized tests and the effect several of the tests have on predicting the learner's capabilities.

Reviewed in Part IV are various studies ongoing throughout the country which address themselves to diagnostic and prescriptive planning for the individualized instruction of the learner. Many of the findings revealed in these studies represent preliminary data scheduled for refinement as their programs move toward a target completion date and the statistics are reviewed and analyzed.

In summary, it is hoped that the literature will serve to provide a somewhat thorough comprehension of the total process by which each child matures through the various learning phases; the ability to understand each child's unique intellectual and perceptual development, a recognition of his learning strengths and weaknesses, and a knowledge of the diagnostic and prescriptive techniques which when implemented will assist in providing him with an opportunity for maximum growth.

I. The Learning Styles of Children: Individual Characteristics

> We should be able to furnish specifications for the type of world we want -- for the type of persons we want our children to become. Yet this is exactly what we have failed to do -- perhaps because we really do not know what we want for our world. Perhaps we have no specifications because what is really important about a person is that part of him we do not know yet or understand. [1]

> All learners are considered unique, and it is understood that any given unique characteristic or any group of characteristics may either facilitate or inhibit the learning of a specific curriculum via a specific teaching strategy as taught by a specific person utilizing a given material. [2]

Several recent studies have dealt with the differences in the ways boys and girls learn. Bannatyne (1969), in a study carried out to determine the relationship between written spelling, motor functioning and sequencing skills, discovered that in the tests that he conducted, sex differences were not a factor, despite the fact that boys are poorer spellers than girls. Maccoby and Carroll (1966) found that girls exceeded boys in auditory and visual discrimination of word elements, articulation and most language abilities. In a study done by Janet Kuene (1973), choices on an auditory cue test were more differentiated in both kindergarten and first grade by girls than by boys, but by grade 2 the patterns of boys and girls were essentially the same. In first grade, the boy's auditory patterns were closer to the less mature kindergarten subjects while the girl's resembled the more mature second graders.

Darrell Lee Brown conducted a study to determine if there were significant correlations between specific mental abilities measured by the 1960 Stanford-Binet Scale and the social status and sex of pre-school children. His conclusions suggested that semantic abilities most frequently favor girls and that test motivation was found to be a significant factor when related to test performance and this motivation related positively for high status children and girls.

Studies have also been conducted to determine if and when there are optimal ages for learning certain skills. Money (1969) emphasized the importance of a

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[1] Robert R. Farrald and Richard G. Schamber, A Diagnostic and Prescriptive Technique: Handbook 1: A Mainstream Approach to Identification, Assessment and Amelioration of Learning Disabilities. (Sioux Falls, South Dakota: ADAPT Press, Inc., 1973) p. 28.

[2] Ibid., p. 18.

"critical period for learning" to master new skills. Hebb (1949) has written that early learning, or its lack, may have a permanent and generalized effect in the adult.

George Ferguson (1954) writes that differences in ability are the result of the complex interaction between the biological propensities of the person, prior learning, and the age at which prior learning occurs. He goes on to advance two hypotheses: the abilities of man are significant variables in the learning process, and learning is affected by the way abilities are learned or overlearned. He therefore, views the role of human ability in subsequent learning as a problem in transfer, a transfer that may have a positive or a negative effect on the task to be learned.

Sontag et. al. (1958) reported that IQ scores during early school years were more stable for girls than for boys, for twice as many boys as girls displayed large increases in IQ during the period of between 6-10 years of age.

Jerome Kagan in an article entitled "Psychological Significance of Styles of Conceptualization", compared analytic and non-analytic children. An analytic person as defined by Kagan, is one who analyzes and differentiates the stimulus field into subelements. This attitude may influence the quality of many kinds of cognitive products. Analytic responses are seen as having a different significance for boys and girls. Kagan conducted a study with 38 boys and 39 girls in two sixth grades from different cities. The learning factors studies included conceptual style, word association and serial learning. Only inferential concepts showed a high, positive correlation with the language score supporting the popular opinion that verbal items on standard IQ tests assess in large measure the degree to which the child has acquired the conventional abstruct levels of his language. The results of this study were supported by an earlier study on 26 boys and 29 girls in the third grade. One of the results was the suggestion that the younger the child, the greater the independence of this conceptual attitude from tested IQ scores.

Analytic children had a greater tendency to associate nonsense syllables to differentiated parts of an original stimulus. Girls made more figure errors than boys and fewer analytic responses, supporting Witkin's findings that girls are more field dependent than boys. Wechsler's normative data dealing with the sex differences on the subtests of the Wechsler Adult Intelligence Scale is additional evidence for a stronger analytic attitude in males. Males performed better on picture completion and block design tests, tasks that require an analytic orientation.

The non-analytic child is described as impulsive, unable to play alone, less able to inhibit urges to action, more distractible, less capable of intense involvement in intellectual tasks requiring concentration and motoric passivity. The analytic child was more sedentary, less hyperkinetic, less impulsive, more apt to become involved in tasks and able to become oblivious to the external surroundings. An inability to inhibit motoric discharge during the childhood years was predictive of future avoidance of intellectual activities.

There is much evidence which points to the relevance of impulsitivity and capacity for sustained attention as possible antecedents to an analytic style in young boys. The evidence is not as clear in the analytic development of girls.

Gardner et. al., (1959) and Witkin et. al. (1954) report that sex differences are not easy to explain. They have also reported that a greater proportion of boys than girls are likely to show extreme degrees of motoricity and impulsive, disorganized behavior outbursts.

Kagan concludes that, "...investigations of cognitive process should perhaps begin to control for preferred conceptual attitudes, just as sex, IQ, and social class are controlled".[3]

In Guilford's Structure of Intellect Theory, Cognition can be found as only one ability area within a total intellectual framework or model (see figure 1). The SOI model can best be defined as a cube structure as illustrated in Meeker (1969). Meeker defines the Structure of Intellect as a model of intellectual abilities. The three dimensions of the model specify, first: the operation, second: the content, and third: the product of a given kind of intellectual act. Complete characterization of an intellectual ability is achieved in terms of the possible subclass differentiation of each of the three major dimensions (see figure 1 illustrated). "Operations" is differentiated in five ways: "Contents" is differentiated in four ways; and "Products" is differentiated in six ways. The complete scheme is represented by a three dimensional classification array of 120 predicted cells or categories of intellectual abilities. A unique definition can be obtained for each cell by simply specifying its characteristics in terms of the three major dimensions (e.g., MFU stands for Memory of Figural Units; CFU stands for Cognition of Figural Units as illustrated in Figure 1, etc.) As Meeker identifies the three classifications and their respective components, she

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[3] Jerome Kagan, Howard A. Moss and Irving E. Siegel. "Psychological Significance of Styles of Conceptualization in Basic Cognitive Processes", Society for Research in Child Development, Vol. 28 (1963) pp. 73-112.

expands the Operations Classification (see Figure 2) to illustrate that where the Stanford-Binet tests a great majority of these abilities, by the use of templates, psychologists can translate components of IQ's from the Binet to the SOI so that individual curriculum planning can be done. In this way, the Binet can be used to show components of intelligence instead of simple IQ scores and teachers can provide experiences for the child which are within the realm of the school responsibility; that is, knowing what a child can or cannot do intellectually will allow the teaching of cognitive abilities which will get him ready for learning.

Darrell Lee Brown (1971) conducted a study of the variations of test response of pre-school children by sex and socio-economic levels related to Guilford's Structure of Intellect (SOI). The purpose of the study was to determine (a) if there were significant correlations between specific mental abilities measured by the 1960 Stanford-Binet Scale and the social status and sex of pre-school children; (b) which specific abilities were most closely correlated to sex and social status; and (c) if the relative magnitudes of the correlations could be predicted from Guilford's Structure of Intellect (SOI). Conclusions drawn suggest (a) that pre-school abilities measured by the 1960 Stanford-Binet do relate differentially to the variables of socio-economic status and sex; (b) that cognition and semantic items most frequently favor children from higher social status families; (c) that semantic abilities most frequently favor girls; and (c) since high status children and girls received more favorable test behavior ratings from examiners and also scored higher in test performance, there was a positive correlation between test motivation (positive test behavior) and test performance.

In a study conducted by Bernard Feldman, the thrust was concerned with the problem of testing criterion related validity of Guilford's Structure of Intellect by predicting first grade reading achievement from selected SOI factors. The specific objectives relative to SOI factors were (a) to confirm the existence of Cognition for Figural Units - Visual (CFO-V), Memory of Figural Units - Auditory (MFU-A), Memory of Figural Units - Visual (MFU-V), Evaluation of Figural Units - Visual (EFU-V), Cognition of Semantic Units (CMU) at the six year old level; (b) to establish the existence of Cognition of Figural Units - Auditory (CFU-A), and the Evaluation of Figural Units - Auditory (EFU-A) at the six year old level; and (c) to identify those abilities (SOI factors) singly and in the best combination, that predict first grade reading achievement.

In view of the results, the following conclusions were made: The Structure of Intellect has criterion-related validity; Memory Figural Units (MFU) as visual forms to speech were most important influences upon reading success; the SOI factors illustrated above could be expanded to include sensory modalities when dealing with figural content dimension; and group administration of factor tests was feasible at the six year old level. A recommendation resulting from the study urged the investigation of the criterion-related validity of the SOI model in other academic areas with different SOI factors. It was also suggested that the construction of reading readiness batteries would benefit from a theoretical foundation in the SOI model since it would give the advantage of construct validity as well as predictive validity and thus provide a meaningful basis for diagnoses and instruction.

Many teacher variables influence learning. The ability and willingness to individualize and personalize instruction is most crucial and will reflect the teacher's knowledge of curriclum and his mastery of a variety of instructional approach and his own perceptions and attitudes.

Guszak, in dealing with cognitive and affective dimensions of reading comprehension illustrates how teachers do measure these various dimensions and how teachers should measure them. The teacher measures Literal Comprehension through a student's skill in recognizing some literal element or recall of such an element, basal text recognition questions, and/or teacher guides. The teacher should measure it by assessing the particular content for basic concepts and sequence of events, and by knowing the background of the students. In measuring reorganization, the teacher should utilize silent strategies in sequencing tasks--ordering pictures, sentences, paragraphs rather than a verbal summary of what was read. Inferential Comprehension is usually measured by asking a child what is going to happen next. Guszak suggests that students make inferences and test themselves by reading the selection to see if they are correct. And when the teacher evaluates, she should ask why something was or was not enjoyed rather than asking students if they liked what they read.

II. Learning Abilities and Disabilities of Children: An Overview

> Schools which view individual differences as obstructions to be eliminated through administrative intervention and schools which organize themselves around the notion that all children can and should be taught the same things at the same time and in the same manner promote failure and militate against a healthy psychological and social adjustment. [4]

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[4] Robert R. Farrald and Richard G. Schamber, op. cit., p. 28.

Frostig (1967) tells us that in teaching children with specific learning abilities/disabilities we need more than an analysis of subject matter, we need to analyze the learner. It is important to know all the abilities which affect learning for effective training to occur. There is a developmental sequence of abilities which enable a child to learn: sensory-motor functions, language and perceptual abilities and the higher cognitive functions (e.g., comprehension and understanding).

In keeping with the Frostig's premise we might advance our study through the analysis of specific learner abilities and disabilities.

A child who experiences a problem in his ability to read, for example, usually has more than one deficit. The observed disability is one aspect of a total syndrome of language capabilities, which is reflected in all modes of comprehension and expression of symbolic material. There are many instances of specific reading disabilities but almost each case is differentiated in some manner. A reading disability can be a problem in its own right or it can be a consequence of other disabilities, but it always affects the child's over all learning style.

Arthur Benton (1962) suggests that there are two major types of specific reading disability: "Parietal Dyslexia" and "Occipital Dyslexia." Parietal dyslexia appears to be relatively independent of oral language disturbance but it is associated with severe dysgraphia where all aspects of writing are disturbed. In the case of this type of dyslexia, general spatial abilities are disturbed, particularily as they are expressed in actions. Benton suggests that this type of disability (parietal dyslexia) may be a result of a combination of perceptual and conceptual deficits. Occipital dyslexia is associated with word blindness and with perservation of writing. Spontaneous writing and writing to dictation is adequate but writing from a model is likely to be poor. According to Benton, "Occipital" dyslexia poses interpretative problems as many clinicians deny the reality of a pure word blindness and insist that careful examination of these cases would disclose defects in the perception of non-symbolic material as well as letters, words and numbers. In view of these determinations, Benton concludes with the question of whether one must not think in terms of an interaction of perceptual and linguistic deficit to account for "occipital dyslexia".

The studies by Benton showed intelligence level to be significantly associated with all levels of right-left orientation and particularly with the more complex performances (e.g., language development). When he matched dyslexia and control children for intelligence rating, he found a higher-than-average incidence of defective orientation in dyslexics. Four of the six dyslexic children in the study did not show a sheer lack of right-left discriminative ability, however, but rather a systematic reversal tendency. Benton found that this systematic reversal tendency was associated with a retardation in the development of language skills. Furthermore, children who showed systematic reversal in response more often failed to correct their orientation when identifying lateral body-parts than did children whose discrimination followed the conventional lines.

In the light of his studies and others, Benton concludes that the ability to discriminate right and left body parts plays a role in the early stages of learning to read and that lack of differentiation of this aspect of the body scheme is associated with retardation in learning to read.

Hunter (1971) reported on the results of a study which attempted to examine how nonreaders differed from children who read at age level or better. The population was divided into two groups of twenty students each; a reading disability group (RD), and a control group (C). Each child was given a battery of tests. The group differed significantly on familial incidence, attentional factors, hyperactivity, birth order, age at crawling and age at school entry. The test areas in which the two groups differed most significantly were on the Bender Visual Gestalt Motor Test and on the Handedness Test. Of the six items of the handedness test, three items were found to discriminate between the RDs and Cs: (1) clasping hands, (2) folding arms and (3) stacking playing cards into a pile with each hand. On the basis of performance on these three items, each child was scored as testing "righthanded", "lefthanded", or "ambidextrous". Although thirty-nine of the forty children customarily wrote with the right hand, the laterality score discriminated significantly between the RDs and the Cs. Seventeen of the 20 RDs tested left handed; only 3 tested righthanded. Of the Cs, 12 tested righthanded, 7 left handed and one tested ambidextrous. A significant correlation was found between percent of righthanded dominance and reading proficiency ($r=+.48$).

The statistically significant correlation between tested laterality (right hand dominance) and reading profiency found in Hunter's Study supports the hypothesis that a relationship does exist between reading disability and laterality. Other studies supporting the same hypothesis include those by: Orton (1937), Eisenberg (1966), Money (1966), Pincus and Glasser (1966), Natchez (1968), Money (1969) and Sparrow (1969). This is not to suggest that mixed laterality is a cause of reading disability per se but rather that they both tend to exist concurrently or are both symptoms of some other dysfunction or developmental immaturity, Eisenberg; Money (1966).

The studies by Money (1966); Frostig (1967); Johnson and Myklebust (1967); Boydstun et al (1968) adhere to the premise that the basic problem of the non-reader may not be input or output deficit but the integration of the various sensory and motor abilities.

Herbert Birch (1962) agrees with many others that a reading disability consists of a group of associated disorders rather than any single disturbance. There is a hierarchical organization of sensory systems which determines to a large extent what constitutes "figure" (that part of the total pattern most clearly perceived at a given moment) as opposed to "ground" (the remainder of the perceptual field or the context). He thinks that reading disability may stem from a failure of the visual system to assert dominance. His research has suggested that dyslexics have disturbances in visual-tactile and visual-kinesthetic relationships more frequently than non dyslexics.

Birch and Lillian Belmont (1964) conducted a study on auditory visual integration in normal and retarded readers. Their population consisted of 200 (9 and 10 year old) children - 150 reading well below grade level, and 50 reading at grade level or beyond. The group or poor readers dealt less effectively with a task requiring judgments or auditory and visual equivalence. For both groups those who had lower auditory-visual scores also had lower scores on four reading tests. The study further suggested that aural and visual units of integration may not correspond on a one-to-one basis and this may be one of the causes of reading difficulty. The major finding of the study was that judgments of auditory-visual equivalence were significantly worse in a group of retarded readers than in normal readers. The analysis strongly suggested that the ability to treat visual and auditory patterned information as equivalent is one of the factors that differentiates good from poor

readers. Birch and Belmont concluded that where other studies have indicated that emotional disturbances, cultural deprivation, disturbances in lateralization of function and other indicators of neurologic dysfunction may be related to the production of reading retardation, the inability to integrate auditory and visual stimuli also appears to have specific relevance to learning to read and appears to be one of the several factors that contribute to reading disability.

Benton, in his discussions on dyslexia, views developmental dyslexia in relation to form perception; stating that the most frequent deficit is impairment of visual perception, especially in the perception of motor differences.

Orton (1937) sees dyslexia as a perceptual deficit connected with visual language function and not with visual function in general. He found that differences in form perception between normal and dyslexic children were only observed up to approximately seven years of age. After this age, there is almost no apparent difference in this respect between the two groups. Orton's conclusions were that deficiency in visual form perception was not an important correlate of developmental dyslexia.

Disagreement with Benton and Orton comes from Gates (1922) and Durrell (1953). Gates cites poor educational methods, unfavorable home influences, emotional factors and defects of vision as the causes of reading disability. He feels that a child who is beginning to read is usually less efficient in the skill of identifying the separate sound in spoken words. He reports on studies done by Murphy (1953) substantiating his theories. One study involved administering ten minutes of ear training to one group having difficulty learning to read (experimental) and no training to a matched group (control). The experimental group had a mean gain of 2.7 words while the control group made a mean gain of one word in the same period. Another study conducted by Murphy measured the effect of ear training on later reading achievement. He discovered that combined ear and visual training yielded the best results, although just ear training often increased reading achievement and learning rate significantly.

According to Durrell, most of the children who came to his clinic with a reading achievement below first grade level had a marked inability to discriminate sounds in words. In those cases where the inability was severe, exercises used with deaf children proved helpful.

Bannatyne's research (1969) supports Durrell in his hypothesis that training in articulation and sound blending significantly improves reading performance. Similarily, Bannatyne found low correlations of spelling achievement with auditory sequencing, auditory discrimination and auditory closure. Some evidence pointed to the fact that reading and spelling were best learned through an active motor writing and spelling curriculum. He found it highly likely that children who have auditory or vocal difficulties may not be able to "hear" or vocally process phonemic elements of words to provide the inner speech cues for satisfactory spelling output.

Barry and others found that there is a positive correlation between auditory analysis ability and reading, mental age, and the extent of vocabulary in grades one through three.

Kuenne (1973) supports a linguistic approach to reading instruction rather than a phonics approach because a child "reads" phoneme syllables not individual phonemes strung together.

The question is often raised concerning the relationship of intellectual ability to reading and whether this relationship changes with age. Joanna Sullivan (1973) studied 250 sixth graders and 276 eighth graders. She gave them tests of convergent and divergent thinking abilities and The California Short-Form Test of Mental Maturity. The results showed that all five intellectual abilities and general intelligence significantly related to literal comprehension and critical reading at both grade levels. The intellectual factors (general intelligence and arithmetic reasoning) related most highly to critical reading at both grade levels. Together the group of intellectual factors was slightly more important than any specific factor, including general intelligence. Thus the intellectual abilities independently are not as important to literal and critical reading skills as they are collectively. Sullivan concluded that verbal fluency and other creative thinking abilities do not significantly contribute to reading achievement when reading achievement is measured by standardized reading tests, and that constructors of standardized reading tests should raise questions about the type of thinking they wish their reading tests to measure.

III. The Evaluation of Learning Abilities and Disabilities: Tests and Measures

> When there is a collision, the last car of the train is usually damaged most. So they have decided that it will be best if the last car is always taken off before the train starts. What is foolish about that? [5]

Educators are and ought to be watching with a sharp eye what we do with the child with learning disabilities for this reason: this child is going to teach us more about learning than all the rats in the mazes and all the college sophomores or memory drums ever did. He won't simply learn if we persist in violating principles of learnings. The normal child can achieve up to grade level on his Stanford Achievement Test even if we never do anything right in the classroom. He will learn in spite of us; but the child with learning disabilities won't and it is through him that we are going to learn about learning.[6]

According to Austin (1971) educational evaluation can be discerning, accurate and illuminating; or it can be superficial, distorted and limited depending upon the objectives, procedures and skills of the evaluator.

Austin believes evaluation is a four step process.

1. Stating purposes according to the needs of the individual, community and society.
2. Obtaining evidence of how well these purposes are being realized.
3. Interpreting the collected information.
4. Redefining goals, establishing new purposes, and planning appropriate programs to achieve the modified purposes.

Austin also believes evaluation to be a continuous process and should include: on-the-spot observational diagnosis: formal diagnosis when observational procedures fail to show what is needed to individualize instruction, and detailed diagnosis exploring the way children learn in intrasensory, intersensory and integrative modes.

Breedlove (1971) further suggests that evaluation and planning are words common to education but often divorced from each other. Planning is requested at the beginning of instruction and all too commonly evaluation is required only at the bottom

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[5] VERBAL ABSURDITIES IV; an item at year XI of Form L-M of the Stanford-Binet Intelligence Scale quoted in Farrald and Schamber, ibid., p. 6

[6] Farrald and Schamber, ibid., p. v.

of the lesson plan, at the conclusion of the project, or at the end of the term. In contrast, diagnostic teaching is the interrelation of evaluation and planning contiguous with instruction.

Frostig believes specific tests can be used effectively to diagnose and evaluate specific learning abilities and disabilities. Specific tests suggested by Frostig include: The Frostig Test for Evaluation of Visual Perception; The Wepman Test for Auditory Perception of Speech Sounds; The ITPA for Language Functions and the WISC to evaluate general intelligence and thought processes. The most frequent abilities/disabilities discovered by this battery include: success or failure in visual-motor sequencing and figure-ground perception. Children with learning disabilities show a general inconsistency in test results as opposed to average children, thereby indicating the possibility of developmental imbalance among children with such disabilities.

In her study, Ackerman (1971) used the WISC as an indicator of the strengths and weaknesses of children with specific learning disabilities. The ultimate aim of the study was to develop diagnostic subcategories and tailor specific programs of remediation for children with these deficits. The WISC as a diagnostic tool proved acceptable in that it: (1) showed a significant differentiation in verbal ability between control groups and children with learning disabilities; (2) noted more of a disordance between the Verbal and Performance IQ of children with learning disabilities were lower than controls on 4 subtests; arithmetic, similarities, information, and digit span. The above findings were used as a basis for Ackerman's development of her aims, which were to develop diagnostic subcategories and tailor specific programs of remediation for children with these deficits.

Wolking (1955) found his study of specific aptitude and abilities tests less rewarding. To study the intercorrelations and validities for predicting high school grades, Wolking used the Differational Aptitude Tests (DAT) and the tests of Primary Mental Abilities (PMA). Wolking found that where these tests did demonstrate some potential for predicting academic success in general, the results cast doubt on the immediate usefulness of the various subtests as differential predictors for various subject matters.

Winkley (1971) conducted a study of nine reading, individual and group tests to determine their effectiveness as diagnostic instruments in reading. The tests included:

Bond, Balow and Hoyt Silent Reading Test (BBH)

Botel Reading Inventory (B)

Durrell Analysis of Reading Difficulty (D)

McKillop Reading Diagnostic Test (GM)

McCullough Word Analysis Tests (MC)

Roswell-Chall Diagnostic Reading Tests (RC)

Spache, Diagnostic Reading Scales (SP)

Stanford Diagnostic Reading Test,

Level 1 (St I)
Level 2 (St II)

The tests proved to have a variety of purposes but several of these purposes were not truly diagnostic. Testing the premise that each test would enable a teacher to determine if a child had a reading deficit and identify that deficit, the study found that most of the tests could not in fact determine a child's chief area of skill deficiency.

IV. Diagnostic and Prescriptive Planning: Program and Progress for Individualizing Instruction

> Uniqueness need not be interpreted as 'abnormal' even if it interferes with what we want our children to become. It is responsibility of the school to provide instructional flexibility which insured respect for the integrity and individuality of all children. Schools obviously must attempt to modify behavior--to eliminate those characteristics which interfere with the educational process and to substitute more socially acceptable and productive behaviors. Attempts to modify behavior must, however, be based upon some rather sound--if only tentative--answers to the questions: "What do we want our children to become? What do we want our world to be?"[7]

In their development of a diagnostic and prescriptive technique to identify, asse·s and ameliorate learning disabilities, Farrald and Schamber (1973) see the cognitive and affective structures which a child brings to school as the natural

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[7] Robert R. Farrald and Richard G. Schamber, A Diagnostic and Prescriptive Technique: Handbook 1: A Mainstream Approach to Identification, Assessment and Amelioration of Learning Disabilities. (Sioux Falls, South Dakota: ADAPT Press, Inc., 1973) p. 29

products of the interaction between the child and the total environment in which he has existed. Since that total environment is different for each child, the curriculum must be characterized by great flexibility and must have as its major goal helping children to learn about and achieve mastery of themselves and the world around them. Curriculum should reflect a balanced emphasis on social-emotional adjustment and upon academic achievement.

The teacher has a very heavy responsibility to help children develop behavior patterns which equip them to handle appropriately useful roles in society. "Healthy" behavior patterns can only evolve from an enhancing life experience for the nature of the environment profoundly shapes the emotional and social adjustment of the child.

Farrald and Schamber view the regular classroom teacher not only as an educational generalist, but also as a leader in the diagnostic and prescriptive process. For the farther one removes the diagnostic process from the individual most responsible for a given child's learning, the less potent the diagnostic process becomes in terms of directing appropriate intervention.

This position is further emphasized in an article by Evelyn Jan-Jousch (1971) entitled "The Essential Ingredient in Teaching Every Child To Read". In it she deals with diagnostic techniques used by "specialists" and the impact these techniques have on the total program. She believes we rely too much on these "specialists" and not enough on the classroom teacher to know the concepts the teaching of reading must and does entail. And where testing has been considered in the past as the exclusive domain of the specialist, Jan-Jousch feels that it is becoming increasingly apparent that the responsibility for diagnoses and prescription should be the role of the classroom teacher. She believes that more classroom teachers are not doing diagnostic teaching for one of two reasons: (1) they are not familiar with the process, or (2) they feel it is someone else's responsibility. She concludes by noting two requirements for successful diagnosis of reading ability: (1) to know the learner, and (2) to know the reading process.

Hodges, Mc Candless and Specker (1971) noted that as a result of a three year study dealing with Diagnostic Teaching for Pre-School Children the greatest deficiency in the training and skills of the participating teachers was their weakness in diagnostic teaching. The conventional Special Education of elementary education

methods came off poorly by the criterion of effective diagnostic teaching. The authors felt it was apparent that effective diagnostic teaching procedures must be taught in teacher training institutions if they are ever to be effectively implemented.

The importance of a diagnostically based individualized curriculum, implemented by the classroom teacher aware of and perceptive to the diagnostic and prescriptive process, can be measured in the effectiveness of various programs and educational directions developed throughout the country.

Sapp (1973) reports on Project Success Environment, an experimental program ongoing within the Atlanta Public School System's inner city schools and funded by ESEA Title III, under the leadership of Marion Thompson, former Atlanta School Principal and Boyd McCandless, Consultant and Professor of Psychology at Emory University. The project is a tightly organized system involving three components: a positive reinforcement apparatus, an engineered classroom, and a modified curriculum. The technique enables the classroom teacher the opportunity to create an environment where children consistently experience success and approval through the positive reinforcement of desired behavior traits and through the development of a modified curriculum which enables each child to experience success, work at his own level of competency and receive frequent evaluations with immediate reinforcement. The emphasis in the classroom design is to facilitate individualized instruction utilizing large group instruction, individual interest areas, and one-to-one instruction with the classroom teacher. Data collected to date by the Project staff indicates success. Project classes are less disruptive and more work-oriented than regular classes, with Project classes having made significant gains in IQ scores over the comparative classes and having gained twice as many months in reading and math in the two years that the project has been in existence.

Perhaps the greatest measure of success can be found in the observable evidence of happier children and in the comments made by individual teachers who participate in Project Success:

> The success technique helps me be a person in the classroom and gives me a way to let children be people; the project has given me a new way of looking at an instructional program.
>
> Now I focus on what matters--the children's response; and finally, I don't get tired or tense anymore.

I can teach until the bell rings and then teach on. No matter what happens, I'll never go back to my old way.

In an article entitled "Helping Our Failing Children: Remediating Learning Disabilities", Blazey (1973) reports on a pilot project initiated in one elementary school in the Syracuse City School District. The project utilized the Guilford's Structure of the Intellect (SOI) Theory and its unique model as described by Meeker. The purposes of the project were:

(1) to determine the feasibility of the SOI approach with EMR children;

(2) to determine if any measurable effect upon intelligence could be detected in a time span as short as six months;

(3) to identify effects of the SOI programming upon the affective domain of personality; and

(4) to determine the most effective method of operating such an individualized program within a classroom structure.

Thirteen children from one intermediate EMR class were used in the study. The children were between 9 years 6 months and 11 years 7 months old. The mental age range was between 5 years 6 months and 8 years 6 months. They were non-black, inner city and in the low socio-economic class. The children were routinely placed in the class, with the fact that they would receive the SOI learning abilities training program the only difference between this class and any other EMR class in the school. The teacher involved in the project was given no special training other than a brief explanation of the SOI Theory and Model by Meeker. After individual intelligence testing was administered by school psychologists using the Standford-Binet (L-M) and evaluated according to the SOI mapping procedure, the teacher developed a specific program for each child to increase intellectual functioning. Each child in the group received 60 minutes of SOI instruction each day, three days a week. The task or activities involved in the program were taken directly from the SOI Abilities Workbook developed by Meeker and Sexton (1970). The workbook provided approximately 500 activities designed to meet the specific factorally differentiated intellectual abilities involved in each prescription. The teacher's role was to correlate the prescriptions with the SOI activities on hand. Standard positive reinforcement techniques such as token economy and immediate praise were instituted.

There was a very obvious and abrupt change among the students toward themselves, others and schools in general. The project demonstrated that children labeled "educable mentally retarded" responded very well to the SOI program. A measured effect upon intelligence did occur and the data collected demonstrated that intellectual growth was not random. Thirty-nine percent of the group increased their functioning level (as indicated by IQ) in excess of the Stanford-Binet Intelligence Scale. Fifty-three percent showed no significant change and 8% of the group showed a decrease in functioning. For the most part, the SOI concept of identifying the specific intellectual or learning weaknesses led to educational prescriptions accurate enough to remediate the weaknesses.

Blazey (1973) noted that although there were weaknesses in the experimental design, the results proved the project overwhelmingly successful. The teacher felt that she was supported and had a greater understanding of the child's needs through the SOI program.

Hodges, McCandless, and Specker (1971) in their three year study, sought to determine what kinds of experiences, environment, and training can be effective in enhancing the intellectual level, motor abilities, and personal-social behavior of children from psychosocially disadvantaged homes. The authors were concerned with the development of strategies of remediation from which lesson plans, specific methods of child control and diagnostic procedures could evolve.

Based on the assumption that experience, environment, and training are effective modifiers of intellect for better or worse, they sought to determine what kinds of experience, environment, and training can be effective in enhancing the intellectual level motor abilities, and personal-social behavior of children from psychosocially disadvantaged homes. The authors were interested in developing strategies of remediation from which lesson plans, specific methods of child control, and diagnostic procedures could evolve.

The objectives of their study were: (1) to identify, adapt, and develop techniques and instruments which would be useful in pre-school diagnosis and which would lead to productive curriculum practices; (2) to obtain data concerning the effective use of selected diagnostic tools in curriculum development for children with specified strengths and weaknesses in certain cognitive and affective areas related to school

achievement and adjustment; (3) to develop and refine curriculum strategies for five year old psychosocially deprived children for purposes of ameliorating present cognitive, affective and motor deficits and for purposes of preventing future mental and education retardation: and (4) to evaluate the effectiveness of the diagnostically based curriculum strategies in relation to the purposes in number three.

The study included ten groups of psychosocially disadvantaged five year old children from several communities in central and southern Indiana, representatives of the most severly disadvantaged families in the area. Their collective Stanford-Binet Intelligence Scale Scores ranged between 50 and 85.

The ten groups (fourteen in each) were distributed among treatment procedures over three academic years as follows: three groups exposed to a diagnostic experimental kindergarten (EPS); three groups exposed to a non-experimental program (KC) and four groups remained at home with no formal program (AHC). The basic treatment for each group extended over the academic year prior to the children's entrance into regular first grade classrooms.

It was concluded that a diagnostically based curriculum intervention (EPS) program would more effectively ameliorate the effects of severe psychosocial deprivation in a population of semirural and small town, Appalachian five year old borderline Mental Retardates than would a traditional kindergarten experience which in turn would be more effective than continuing at home.

Results for intelligence, language and personal-social development generally fell directly in line with prediction. For fine and total motor skills, both types of school experience were equally associated with more gain than with continued residence in the home.

The major purpose of the Indiana Project was to demonstrate the greater effectiveness of specific diagnostic teaching and curriculum strategies over traditional kindergarten practices. The authors noted that the curriculum and teaching strategies used were more important than the packaged lessons developed. With the exception of specifically developed diagnostic language and fine motor lessons, the experimental curriculum included many kinds of activities such as music, art, physical education, free play and story telling found in regular pre-school and kindergarten programs. The manner in which these activities were employed differed from the

traditional in that every activity was used for the development and remediation of the specific cognitive, psychomotor, and affective behavior of each individual child rather than as ends in themselves.

The importance of diagnostic and prescriptive intervention has been further substantiated in the following studies:

Silver and Hagin (1970-71) examined 168 children in the first grade of a public school in the lower east side of New York. The children were examined psychiatrically, neurologically, perceptually, psychologically and educationally. The purpose of the examination was the detection of children with potential emotional and cognitive disabilities and the treatment of these children before their symptoms hardened into educational and emotional failure. Fifty-six children received selected training based upon their individual deficits. These specific children were selected because: there existed perceptual deviations in spatial and temporal organization, cerebral dominance for language had not yet been established, and each child experienced difficulty in fine motor coordination. The fifty-six children were then retested upon completion of the diagnostic and prescriptive intervention and were found to be comparable to the total first grade class in their achievement of reading skills.

McCarthy and McCarthy reflected the importance and the need for differential diagnosis. They noted that optimal results were not in evidence when remedial procedures were based upon gross or inaccurate diagnosis. And they concluded that diagnosis must, not only distinguish the child with learning disabilities from the child with categorical disabilities (e.g., mental retardation, deafness) but must suggest a course of action.

Recently some thought has been given to educational intervention before the child enters public school. Early childhood education programs for the child with learning deficits is rapidly receiving increased interest. Some studies have indicated the following:

> Children with reading problems can be identified during the preschool years. (deHirsch, et. al., 1966)

> Preschool training has a positive effect on later intelligence and achievement test scores among retarded children. (Kirk, 1958)

Structured preschool programs, as compared with unstructured programs, result in greater gains. (Karnes, 1968)

Evans and Bangs (1972) combined a study of a preschool predictive instrument with the assessment of the effects of preschool training on the later academic achievement of children with language and learning disabilities. A preliminary follow-up study of children who were initially evaluated and trained in a joint project of the Houston Speech and Hearing Center and the Pasadina, Texas Independent School District from 1963-66 revealed a marked difference in later academic achievement. Of those subjects with language and learning disabilities, 70% who completed the program of preacademic training were found to be achieving at grade level. Of those who began the program but did not complete it, only 25% were achieving at grade level. Of the control group not exposed to the preacademic training program, only 18% were achieving at grade level.

It must be pointed out that there are those children who do not learn to read, even though they have average or above-average intelligence. Research conducted by Smith and Dapper (1970) has shown that the learning problems of these children are of such a special nature that they can respond neither to classroom instruction nor to the usual corrective techniques. Specialized help, on a one-to-one basis and often medically based must be provided and it is evident that more and more school systems are turning to diagnostic clinics to offer the help these children need.

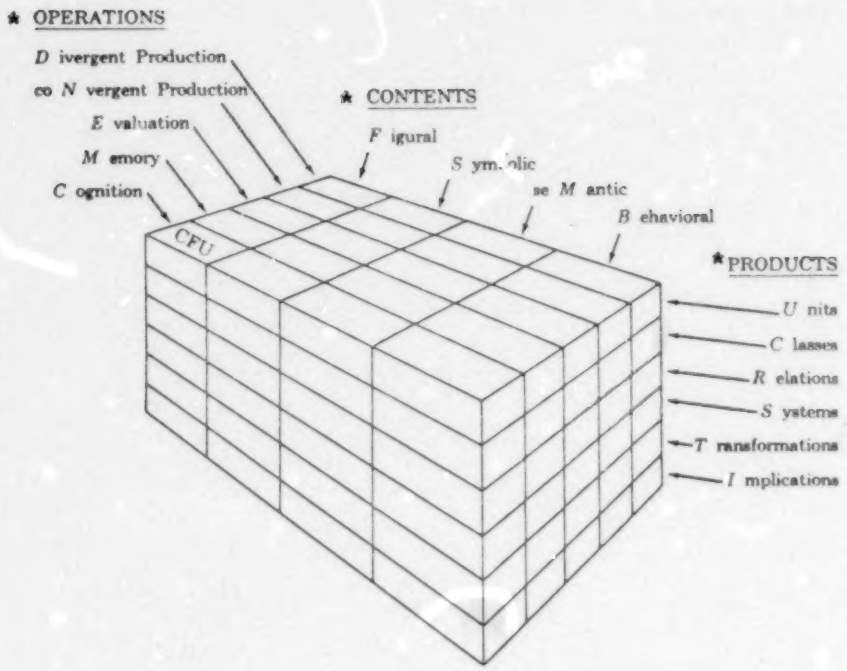
Hodges, et. at. conclude that schools, as they are, exist and will continue to exist. Only a false idealism denies that children must be prepared to meet them as they are. But it is idle to prepare a child for a hypothetical, ideal elementary school; he is cheated if he is not encouraged to think inductively, be courious, and work toward the development of his creativity.

And Farrald and Shamber continue in noting that the teacher who individualizes instruction in her classroom will greatly enhance each child's ability to master his environment--whether the mastery involves the school's formal learning requirements, mastery of social skills, or the general positiveness of self-concept. Teachers who fail to individualize instruction at best fail to make a difference in the lives of all pupils for whom they are responsible--at worst, they manage to do a great damage to a few.

Figure 1

Guilford's Cubed Structure of Intellect

as printed in Meeker*



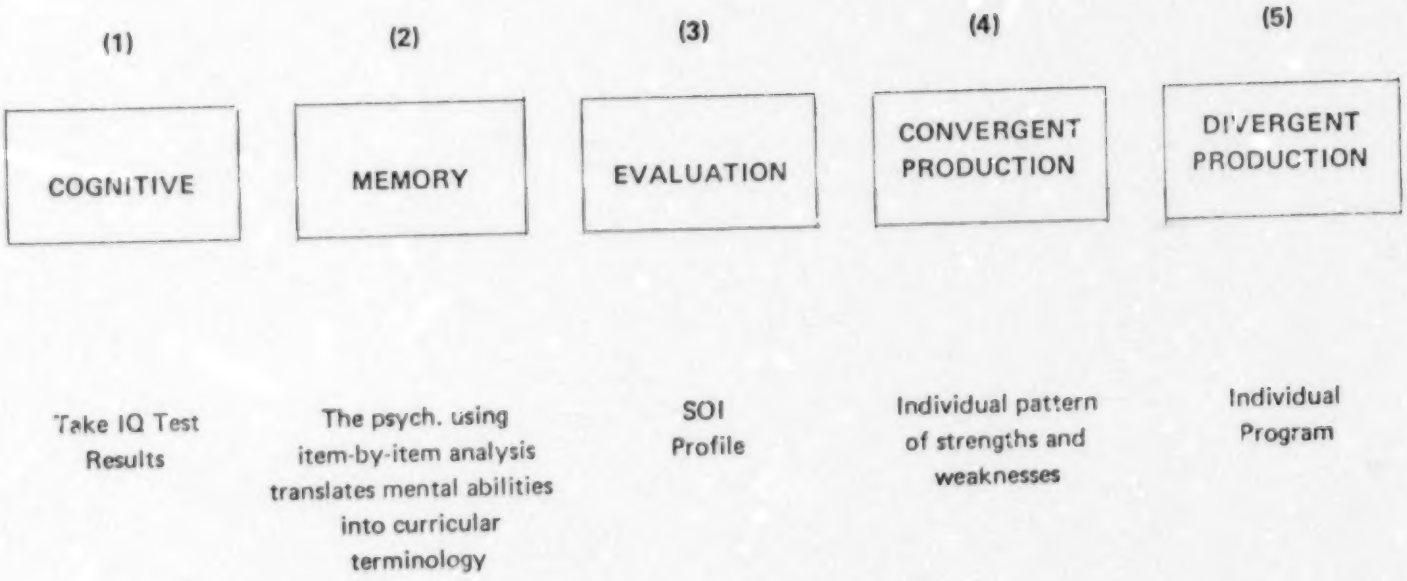
*Mary N. Meeker. "Using Cognitive Activities as the Diagnostic Basis for Curriculum Planning". Structure of Intellect - Its Interpretation and Uses. Columbus, Ohio: Charles E. Merrill. 1969.

Figure 2

Meeker's Interpretation of Guilford's SOI Classification "Operations"

as it Relates to a Diagnostic Approach

to Curriculum Planning[6]



6 *Mary N. Meeker. "Using Cognitive Activities as the Diagnostic Basis for Curriculum Planning". Structure of Intellect · Its Interpretation and Uses. Columbus, Ohio Charles E. Merrill. 1969.*

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